

WHAT IS CLAIMED IS:

- 1 1. A multicolor display comprising
2 a substrate; and
3 at least one multicolor generation site coupled to said substrate, each of
4 said at least one multicolor generation sites comprised of:
5 at least two light emitting regions proximate to one another; and
6 at least one wavelength conversion layer applied to at least one of
7 said at least two light emitting regions, wherein said at least two light emitting
8 regions in combination with said at least one wavelength conversion layer emit at
9 least two different colors.
- 1 2. A multicolor display comprising
2 a substrate; and
3 a multicolor generation site grown on said substrate comprising:
4 at least two LEDs proximate to one another; and
5 a first wavelength conversion layer applied to a light emitting
6 surface of a first of said at least two LEDs, wherein said at least two LEDs in
7 combination with said first wavelength conversion layer emit at least two different
8 colors.
- 1 3. The multicolor display of claim 2, wherein said at least two LEDs
2 are comprised of three individual LEDs proximate to one another.
- 1 4. The multicolor display of claim 3, further comprised of a second
2 wavelength conversion layer applied to a light emitting surface of a second of said three
3 individual LEDs, wherein said three individual LEDs in combination with said first and
4 second wavelength conversion layers emit three different colors.
- 1 5. The multicolor display of claim 2, wherein said at least two LEDs
2 emit light at a wavelength in the range of wavelengths between 4,000 and 4,912
3 Angstroms.
- 1 6. A multicolor display comprising

2 a substrate; and
3 a plurality of multicolor generation sites grown on said substrate, each of
4 said plurality of multicolor generation sites comprised of:
5 at least two LEDs proximate to one another; and
6 a wavelength conversion layer deposited on a light emitting surface
7 of a first of said at least two LEDs, wherein said at least two LEDs in combination
8 with said wavelength conversion layer emit at least two different colors.

1 7. The multicolor display of claim 6, further comprising an index
2 matching layer interposed between said wavelength conversion layer and said light
3 emitting surface of said first LED.

1 8. The multicolor display of claim 6, further comprising a protective
2 layer deposited on an exterior surface of said wavelength conversion layer.

1 9. The multicolor display of claim 6, further comprising a protective
2 layer deposited on a light emitting surface of a second of said at least two LEDs.

1 10. The multicolor display of claim 6, further comprising a region of
2 opaque material deposited between said at least two LEDs.

1 11. The multicolor display of claim 6, wherein said substrate is
2 selected from the group consisting of sapphire, silicon carbide and gallium nitride.

1 12. The multicolor display of claim 6, wherein said at least two LEDs
2 emit light at a wavelength in the range of wavelengths between 4,000 and 4,912
3 Angstroms.

1 13. The multicolor display of claim 6, further comprising a cross-talk
2 minimization layer interposed between said substrate and said at least two LEDs.

1 14. The multicolor display of claim 13, wherein said cross-talk
2 minimization layer is comprised of a Bragg reflector.

1 15. The multicolor display of claim 13, wherein said cross-talk
2 minimization layer is comprised of a partially absorbing layer.

1 16. A multicolor display comprising

2 a substrate; and
3 a plurality of multicolor generation sites grown on said substrate, each of
4 said plurality of multicolor generation sites comprised of:

5 three LEDs proximate and immediately adjacent to one another;

6 a first wavelength conversion layer deposited on a light emitting
7 surface of a first of said three LEDs; and

8 a second wavelength conversion layer deposited on a light emitting
9 surface of a second of said three LEDs, wherein said three LEDs in combination
10 with said first and second wavelength conversion layers emit three different
11 wavelengths.

17. The multicolor display of claim 16, wherein said substrate is
selected from the group consisting of sapphire, silicon carbide and gallium nitride.

18. The multicolor display of claim 16, wherein said first and second
wavelength conversion layers are selected from the group of materials consisting of
phosphors and active polymers.

19. The multicolor display of claim 16, wherein said three LEDs emit
light at a wavelength in the range of wavelengths between 4,000 and 4,912 Angstroms.

20. The multicolor display of claim 16, wherein said first wavelength
conversion layer converts light in a first wavelength range of between 4,000 and 4,912
Angstroms to light in a second wavelength range of between 4,912 and 5,750 Angstroms.

21. The multicolor display of claim 16, wherein said second
wavelength conversion layer converts light in a first wavelength range of between 4,000
and 4,912 Angstroms to light in a second wavelength range of between 6,470 and 7,000
Angstroms.

22. The multicolor display of claim 16, further comprising:
a first index matching layer interposed between said first wavelength
conversion layer and said light emitting surface of said first LED; and
a second index matching layer interposed between said second wavelength
conversion layer and said light emitting surface of said second LED.

1 23. The multicolor display of claim 16, further comprising:
2 a first protective layer deposited on an exterior surface of said first
3 wavelength conversion layer; and
4 a second protective layer deposited on an exterior surface of said second
5 wavelength conversion layer.

1 24. The multicolor display of claim 23, wherein said first and second
2 protective layers are equivalent layers.

1 25. The multicolor display of claim 23, further comprising a third
2 protective layer deposited on a light emitting surface of a third of said three LEDs.

1 26. The multicolor display of claim 16, further comprising a region of
2 opaque material deposited between adjacent surfaces of said three LEDs.

1 27. The multicolor display of claim 16, further comprising:
2 a plurality of channels within said substrate, said plurality of channels
3 separating adjacent LEDs of said three LEDs; and
4 opaque material deposited within said plurality of channels.

1 28. The multicolor display of claim 16, further comprising a cross-talk
2 minimization layer interposed between said substrate and said at least two LEDs.

1 29. The multicolor display of claim 28, wherein said cross-talk
2 minimization layer is comprised of a Bragg reflector.

1 30. The multicolor display of claim 28, wherein said cross-talk
2 minimization layer is comprised of a partially absorbing layer.

1 31. A method of fabricating an active, multicolor display, comprising
2 the steps of:
3 defining a plurality of multicolor generation sites on a single substrate;
4 growing at least two LEDs on said substrate at each of said plurality of
5 multicolor generation sites; and
6 depositing a wavelength conversion layer on a light emitting surface of at
7 least one of said at least two LEDs at each of said plurality of multicolor generation sites.

1 33. The method of claim 32, further comprising the steps of:
2 depositing a first index matching layer on said light emitting surface of
3 said first of said three LEDs at each of said plurality of multicolor generation sites prior to
4 depositing said first wavelength conversion layer; and
5 depositing a second index matching layer on said light emitting surface of
6 said second of said three LEDs at each of said plurality of multicolor generation sites
7 prior to depositing said second wavelength conversion layer.

1 34. The method of claim 32, further comprising the steps of:
2 depositing a first protective layer on an exterior surface of said first
3 wavelength conversion layer; and
4 depositing a second protective layer on an exterior surface of said second
5 wavelength conversion layer.

